



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/692,397

10/23/2003

Jacob Cherian

016295.1469 (DC-05355)

8479

23640

7590

04/06/2009

BAKER BOTTS, LLP

910 LOUISIANA

HOUSTON, TX 77002-4995

EXAMINER

ROJAS, MIDYS

ART UNIT

PAPER NUMBER

2185

NOTIFICATION DATE

DELIVERY MODE

04/06/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

debbie.allen@bakerbotts.com

Office Action Summary	Application No.	Applicant(s)	
	10/692,397	CHERIAN, JACOB	
	Examiner	Art Unit	
	MIDYS ROJAS	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-12, 14-20, 23 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-12, 14-20 and 23-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/19/2009 has been entered.

Response to Arguments

2. Applicant's arguments filed on 2/19/2009 have been fully considered but are not persuasive.

Regarding the 103 rejections of Claims 1-8, 10-12, 14-20, and 23-24, Applicant argues that Green does not teach returning a success status without caching the write operation. Applicant interprets the Green reference in a way such that the write is only acknowledged once it is complete. However, Green teaches the acknowledgement of a write operation that is never cached or completed (paragraph 0032). Green's system identifies acknowledged incomplete writes in order to re-transmit the write for completion. This means that the incomplete acknowledged write operation is never completed and a new write command must be transmitted in its place. Additionally, Green discloses that acknowledgements from the highest level of the caching system 270-N offers better performance but is less reliable (paragraph 0032) because the highest level of the caching system 270-N will receive a first write request and

Art Unit: 2185

acknowledge it prior to sending a second write request including the data included in the first write request to an immediately lower level caching system. Therefore, the write is acknowledged by the highest level caching system prior to the write request being completed by the lowest level caching system (paragraph 0045).

The examiner maintains that Applicant is not properly interpreting paragraph 0032 of Green.

In paragraph 0032 of Green, it states that typically all write operations must be acknowledged. This means that all write operations, those completed or not completed, have been acknowledged as successful. Then paragraph 0032 goes on to explain what happens when an acknowledged write (from all of the writes that have already been acknowledged) has been lost or is incomplete. The acknowledgement of Green does not identify the incomplete write. Green is simply explaining that all writes have been acknowledged and after being acknowledged, some of them are identified as incomplete. This means that once the system identifies that one of the acknowledged writes is incomplete, it must re-transmit that particular write. Therefore, at the point at which the system determines that one of the acknowledged writes is incomplete, that particular write has been acknowledged as successful but it has not been cached due to it being lost or incomplete. For this reason, the examiner maintains that Green's acknowledgement is not an acknowledgement of it being incomplete. The two operations are independent. The system acknowledges writes and then identifies which of the acknowledged writes are incomplete.

Additionally, the examiner would like to point out that the independent claims contain subject matter that is not supported by the specification and it's therefore, considered to be "new matter". The specification does not support the write operation not being written to disk nor re-transmitted (please see 112 rejection below). Due to the 112 rejection of these claims, the rejection under 35 U.S.C. 103 over Horst et al. (6,549,977) in view of Johnson (2002/0138670) further in view of Green (2002/0188801) still applies to the rejection of the claims.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 4, and 12, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims are drawn to returning a success status to the requesting application without forwarding the write operation for processing or caching the write operation, such that the write operation is neither completed **nor written to disk nor re-transmitted**. The specification supports returning a success status without forwarding the write operation for processing. The specification does not support limitations drawn to the write operation being neither written to disk nor re-transmitted. Paragraph 0041 of the specification describes returning a success status

Art Unit: 2185

to the requesting application without forwarding the write operation for processing or caching the write operation, such that the write operation is not completed. Stating that the write operation is not completed does not prevent the write operation from being cached or from being re-transmitted; therefore, the specification does not prevent the writing of the write operation to a disk (such as a cache) or re-transmitting the write operation.

Claims 2-3, 5-8, 10-11, 14-20, and 23-25 are rejected under 35 U.S.C. 112, first paragraph for having the same deficiencies as that claims that they depend from.

Due to the 112 deficiencies of the claims as amended, the previous rejection of the claims still applies.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) that forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-8, 10-12, 14-20, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horst et al. (6,549,977) in view of Johnson (2002/0138670) further in view of Green (2002/0188801).

Regarding Claim 1, Horst discloses a method for volume manager based redundant array of independent disks creation (RAID, this system allows for the reduction of RAID rebuilding time, abstract), comprising:

monitoring input/output (I/O) operations (by array controller 124, steps 202-216, Figure 2, Col. 8, line 40- Col. 9, line 42) between an information handling system volume manager (I/O transfer and host interface circuitry 130) and an information handling system disk driver (122);

if a particular I/O operation is a write operation to the data portion of the RAID volume, returning a success status to the requesting application and not forwarding the write operation for processing, such that the write operation is not completed ("existing systems are typically configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller... but before the data has been written to disk", Col. 1, line 20-33). The return of the success status is represented by informing the host that the write has been completed; the write operation is not forwarded for processing since the data is instead written to the cache, in holding the data in the cache, the write operation is not completed since the data has not been written to the disk.

Horst cache does not constitute a queue because it does not hold the written data in any particular order and does not send the data it holds to the disk in any particular order, as queues are known to do. Additionally, the cache of Horst does not hold the write operation for later processing, but instead holds the write data. This data is later flushed to the disk. Therefore, technically, the write operation is not forwarded to the disk at any time. Instead, a flush occurs where all the data written to the cache is copied onto the disk. This is not equivalent to queuing the write operation to process it in the disk at a later time since at the time of the flush that particular write operation is

not going to be performed, but instead all of the contents of the cache will be written on to the disk; and

if a particular I/O operation is an access to a non-data portion of the disk RAID volume, passing the non-data portion access I/O operation to the disk driver for processing (access to lookup table within RAM 228 are allowed during system operation, Col. 12, lines 44-57 and since those operations must be performed in a quick access they must be passed to a driver for quick processing).

Horst does not specifically teach intercepting I/O operations between the volume manager and the disk driver and identifying a particular intercepted I/O operation from a requesting application.

Johnson et al. teaches a device drive filter 8, which intercepts, identifies, and filters access commands depending on their priority (paragraph 0022). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the filter of Johnson in the system of Horst since such a filter would facilitate the identification of access commands to the data portion of the RAID (which in this case would be low priority) and access commands to the non-data portion of the RAID (in this case they would be high priority since they must be processed for quick access).

Although Horst in view of Johnson teaches not forwarding the write operation for processing, Horst in view of Johnson does not teach not caching the write operation so that the write operation is not written.

Green discloses the acknowledgement of a write operation that is never cached or completed (paragraph 0032). Green's system identifies the acknowledged

incomplete writes in order to re-transmit the write for completion. This means that the incomplete acknowledged write operation is never completed and a new write command must be transmitted in its place. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the identification of acknowledged incomplete write operation, as done by Green, in the combination of Horst in view of Johnson since doing so provides enhanced system performance (as described by Green, paragraph 0032).

Regarding Claim 2, Horst discloses the method further comprising initializing creation of a parity based RAID wherein RAID-5 is a parity based RAID (Col. 5, lines 35-38).

Regarding Claim 3, Horst discloses the method further comprising creating RAID-5 parity based RAID (Col. 5, lines 35-38).

Regarding Claim 4, Horst discloses an information handling system, comprising
at least one processor (124);
a memory operably associated with the processor (cache 132);
at least three information storage devices operably coupled to the memory and the processor (110); and
a program of instructions storable in the memory and executable by the processor, the program of instructions operable to:
process I/O operations directed to accessing RAID disk structures (increasing write performance, Col. 2, lines 26-38; increasing read performance, Col. 3, lines 34-

Art Unit: 2185

38), and I/O operations directed to accessing RAID configuration information, by passing them to a disk driver for processing (access to lookup table within RAM 228 are allowed during system operation, Col. 12, lines 44-57 and since those operations must be performed in a quick access they must be passed to a driver for quick processing);

filter I/O operations directed to accessing a data portion of the RAID (since the system has the ability to process access requests to the lookup table and to the RAID data, it must intercept and identify the incoming requests), including for each write operation directed to the data portion of the RAID, returning a successful status to an application requesting the write operation and not forwarding the write operation for processing. (Cache 132 receives data received from host before it has been written, Col. 5, lines 48-53; “existing systems are typically configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller... but before the data has been written to disk”, Col. 1, line 20-33). The return of the success status is represented by the act of informing the host that the write has been completed. The write operation is not forwarded for processing since instead the data is written to cache, in holding the data in the cache; the write operation is not completed since it has not been written to the disk.

Horst cache does not constitute a queue because it does not hold the written data in any particular order and does not send the data it holds to the disk in any particular order, as queues are known to do. Additionally, the cache of Horst does not hold the write operation for later processing, but instead holds the write data. This data

is later flushed to the disk. Therefore, technically, the write operation is not forwarded to the disk at any time. Instead, a flush occurs where all the data written to the cache is copied onto the disk. This is not equivalent to queuing the write operation to process it in the disk at a later time since at the time of the flush that particular write operation is not going to be performed, but instead all of the contents of the cache will be written on to the disk.

Horst does not specifically teach intercepting I/O operations between the volume manager and the disk driver and identifying a particular intercepted I/O operation from a requesting application.

Johnson et al. teaches a device drive filter 8, which intercepts, identifies, and filters access commands depending on their priority (paragraph 0022). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the filter of Johnson in the system of Horst since such a filter would facilitate the identification of access commands to the data portion of the RAID (which in this case would be low priority) and access commands to the non-data portion of the RAID (in this case they would be high priority since they must be processed for quick access).

Although Horst in view of Johnson teaches not forwarding the write operation for processing, Horst in view of Johnson does not teach not caching the write operation so that the write operation is not written.

Green discloses the acknowledgement of a write operation that is never cached or completed (paragraph 0032). Green's system identifies the acknowledged incomplete writes in order to re-transmit the write for completion. This means that the

incomplete acknowledged write operation is never completed and a new write command must be transmitted in its place. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the identification of acknowledged incomplete write operation, as done by Green, in the combination of Horst in view of Johnson since doing so provides enhanced system performance (as described by Green, paragraph 0032).

Regarding Claim 5, Horst discloses the information handling system further comprising the program of instructions operable to intercept I/O operations between a volume manager 130 and the disk driver of the information handling system 122 (interception being done by array controller 124, steps 202-216, Figure 2, Col. 8, line 40- Col. 9, line 42).

Regarding Claim 6, Horst disclose the information handling system further comprising the program of instructions operable to intercept all I/O operations between the volume manager and the disk driver during RAID creation (see abstract, the method of the invention provides reductions in RAID volume creation times; interception being done by array controller 124, steps 202-216, Figure 2, Col. 8, line 40- Col. 9, line 42).

Regarding Claim 7, Horst discloses the information handling system further comprising the program of instructions operable to verify that the information storage devices have been zeroed (activity bins are zeroed on demand before the first write, thus ensuring that they are zeroed, Col. 3, lines 19-24).

Regarding Claim 8, Horst discloses the information handling system further comprising the program of instructions operable to respond to read operations directed

to the data portion by returning a zeroed buffer to an application requesting the read operation and not forwarding the read operation for processing (since during creation of the disk array all the data in the array is equal to zero, zeroes are returned without performing a read of the disk media, Col. 3, lines 34-38).

Regarding Claim 10, Horst discloses the information handling system further comprising the program of instructions operable for execution during creation of a parity-based RAID wherein RAID-5 is a parity based RAID (Col. 5, lines 35-38).

Regarding Claim 11, Horst discloses the information handling system further comprising the program of instructions operable for execution during creation of a RAID-5 parity-based RAID (Col. 5, lines 35-38).

Claim 12 is rejected using the same rationale as that of Claims 1 and 4.

Regarding Claim 14, Horst discloses the computer readable medium further comprising the program of instructions operable to return write operations associated with the data portion of the RAID with a good status ("existing systems are typically configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller... but before the data has been written to disk", Col. 1, line 20-33 wherein these writes are write operations of RAID data, cache 132 receives the RAID data received from host before it has been written, Col. 5, lines 48-53) to the requesting application and not forwarding the write operations for processing. The return of the success status is represented by the act of informing the host that the write has been completed. The write operation is

Art Unit: 2185

not forwarded for processing since it is instead held in the write cache, in holding the operation in the cache; the write operation is not completed.

Claim 15 is rejected using the same rationale as that of Claim 8 wherein zero is a predefined value.

Claim 16 is rejected using the same rationale as that of Claim 8.

Claim 17 is rejected using the same rationale as that of Claim 5.

Regarding Claim 18, Horst discloses the computer readable medium further comprising the program of instructions operable to pass to the disk driver for processing, I/O operations associated with configuration of the RAID (access to lookup table within RAM 228 are allowed during system operation, Col. 12, lines 44-57).

Regarding Claim 19, Horst discloses the computer readable medium further comprising the program of instructions operable to pass to the disk driver for processing, I/O operations concerning RAID disk structures (access to lookup table within RAM 228 are allowed during system operation, Col. 12, lines 44-57).

Claim 20 is rejected using the same rationale as that of Claim 11.

Claims 23 and 24 are rejected using the same rationale as that of Claim 8.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIDYS ROJAS whose telephone number is (571)272-4207. The examiner can normally be reached on M-TH 6:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sanjiv Shah/
Supervisory Patent Examiner, Art Unit 2185

/Midys Rojas/
Examiner, Art Unit 2185